

Increasing the descriptive power of CHAT with culturally advanced notation

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Abstract

Language is a tool, and hence directly affects the outcome of any activity undertaken. This paper describes such a tool together with the proposition that it will improve the use of the concept of contradictions as a conceptual tool within activity theory. The authors find that within their own research activity, adopting a concise but descriptive notation has greatly enhanced the quality of communication and therefore directly impinges on the quality of research outcomes. The notation is described and support provided for its adoption.

Keywords

Activity Theory; contradictions; culturally advanced activities; historicity

1 INTRODUCTION

Activity theory, in its various forms, does provide a useful conceptual framework for the study of human endeavour (Engeström, 1987). This is particularly so in the information systems discipline, a discipline which is concerned with how people use tools (technology) to achieve organizational and personal goals. It has proved useful in both quantitative and qualitative research, but the use of Cultural Historical Activity Theory (CHAT) provides such a natural conceptual framework that it also helps the qualitative and quantitative studies to be combined, compared and extended. It provides a lens through which complex situations can be systematically analysed and can be summarized with the help of five principles.

The most obvious application of CHAT is based on Engeström's activity framework and activity systems Figure 1(Engeström, 1999). Some reports have exhibited a simplistic application of CHAT, but have never the less contributed to our knowledge of human endeavour, human learning, the effect of community and the use of tools.

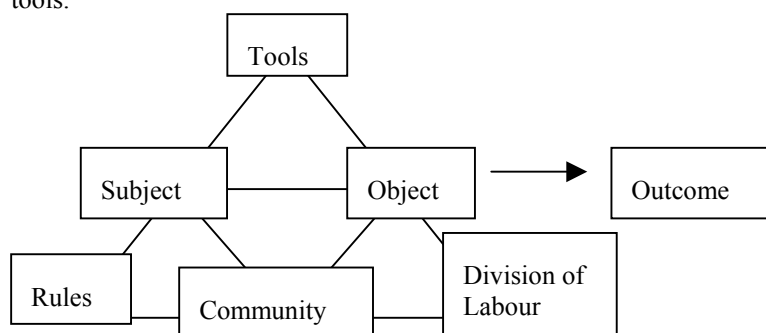


Figure 1: The structure of a human activity system (Engeström, 2001, p.135)

For many of us it is hard to think of a learning organization and concepts such as knowledge management without seeing inter connecting triangles as part of the explanation of what is happening. This allows the “viewer” to gain a better understanding of very complex human activity.

It is this desire to better understand complex human activity that created the notation described in this paper. Inevitably, the notation and associated concepts will also carry with it the view of activity theory shared by the authors. We describe it here in the hope that others share this view and so find the work useful.

The paper has five sections. The following section describes *historicity*, a concept fundamental to describing an evolving activity system. We then briefly describe Engeström’s theory of contradictions within human activity systems, and this leads naturally to a section which discusses the idea of *culturally advanced activities* and how a better understanding of them leads to a richer understanding of human activity, especially in activities which can be described as “knowledge work”. In the concluding section the paper raises more questions than it has answered. Part of the evidence of the value of the notation is that it enables such a simple discussion of such complex questions.

2 HISTORICITY

Current, future and historical activities exist together, plans and the future activities can be improved by being more conscious of how our historical experience “shapes both mental models and the effectiveness of social learning” (Stahl-Role, 2000, p.25).

Historicity is not history. History isolates the past, and tells the past as a completed story. Historicity is about understanding the interactions and dynamics of the human activity being studied given that the activity, or activity system, evolves and changes over time (Jonassen and Rohrer-Murphy, 1999). Historicity is placing things in context, understanding where you are now, and where you have come from.

Hirsch and Stewart (2005, p.262) describe historicity in terms of flow. Versions of the past, present and future form a *flow*. The present form is part of the flow that is influenced by factors such as other events, political needs, cultural forms and emotional dispositions. “Historicity in this sense is the manner in which persons operating under the constraints of social ideologies make sense of the past, while anticipating the future” (Hirsch and Stewart, 2005, p.262).

It is this nature of historicity that makes it so natural to the researcher operating in a social constructivist paradigm. Rather than objectively isolating the past (as in history), the use of historicity assumes an ongoing social production of the current activity (Hirsch and Stewart, 2005). In Hirsch and Stewart’s words: “the fusion of past, present and future at issue in such cases does not always occur consciously or voluntarily” (Hirsch and Stewart, 2005, p.269). Without this approach it is not possible to understand the dynamics of an activity system, nor is it possible to analyse the changes in activities and their evolution through sustained social and technological pressures.

Historicity, combined with the possibility of expansive transformations, leads to a situation where you need a way of describing multiple activities in multiple timeframes and the interactivity contradictions that this entails. The notation described in this paper has helped the authors to have clear unambiguous conversations about an activity system and the multiple contradictions.

3 CONTRADICTIONS WITHIN ACTIVITY SYTEMS

In introducing this new notation, we will use Engeström’s activity system as a starting point. Figure 2 shows Engeström’s idea of a complex activity with four levels of contradictions acting on different components of the system. Table 1 provides a definition each of the contradictions. The existing contradiction notation allows for the depiction of the central activity, concurrent activities (connected to the central activity by quaternary contradictions) and the culturally more advanced central activity (connected to the central activity by tertiary contradictions).

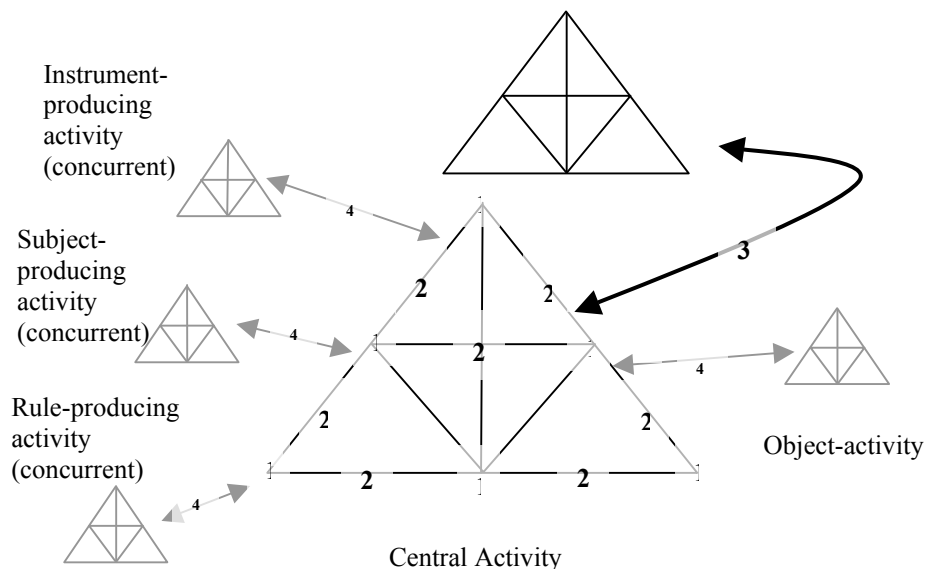


Figure 2: Four levels of contradictions within the human activity system (Engeström, 1987, p.30)

Table 1: The four levels of contradictions (Engeström, 1987)

Contradiction	Occurrence	Definition
Primary	Within elements of a single activity	In practice this kind of contradiction can be understood in terms of breakdowns between actions or sets of actions which realise the activity.
Secondary	Between elements of a single activity	In practice this kind of contradiction can be understood in terms of breakdowns between elements within the activity.
Tertiary	Between an activity and its culturally more advanced form of the activity	A culturally more advanced activity is one that has transformed into either an expanded activity (with more possibilities) or a contracted activity (with fewer possibilities).
Quaternary	Between the central activity and one of its neighbouring activities	Neighbouring activities are those that "uses" its result, or activities contributing to the elements of this activity

This notation has been adequate in defining various activity system scenarios by a number of researchers (Boer et al, 2002; Roth and Tobin, 2002; Yamagata-Lynch, 2006). However, we have found the need to describe activity systems with greater complexity than that shown in Figure 2. The next section describes the model developed to cope with that need, and has consequently led to further research questions which are described in the concluding section to this paper.

4 THE CULTURALLY ADVANCED NOTATION

In order to develop the concepts and illustrate their application, we will consider the situation where a knowledge worker is planning a new activity. In this example, our knowledge worker is a facilitator of a meeting of other knowledge workers, and is planning on facilitating a new meeting in a new environment. We assume our planner is an experienced facilitator but is confronted with a new situation. This could be a face to face facilitator having to facilitate an online meeting, working with a new group of participants (a situation consultants are often faced with), or some other variation. This was the focus of a recent research project the authors were involved with (not reported here), with the research focussed on the planning activity of such a knowledge worker. In the study g how facilitators of collaborative activities would use past experience to plan for a similar activity in a new situation.

Using Engeström's activity system as the conceptual framework for the analysis resulted in the meetings and other concurrent activities formed part of a very complex activity system. Planning involves the combination of reflection-on-action (Schön, 1983) as well as reflection-before-action (Greenwood, 1993)

Engeström's activity system allows one to consider two states of the central activity and the concurrent activities of the central activity. However, when considering activities such as planning, where reflection-before-action is required, additional activities, culturally advanced activities, and concurrent activities need to be added to the activity system. We also note that the activity system is not static, but unfortunately the use of Engeström's diagram sometimes gives the reader that impression.

In the example described above, the addition of further activities, the strong interaction between them (the contradictions), and the occurrence of more than one instance of culturally advanced transformation occurring, meant that communication and theory development was cumbersome using the current notation. As the activity system was expanded, even the questions we wanted to ask became cumbersome and lacked clarity. Difficulties with Engeström's notation become evident in the planning activity system because there is a need to consider a 'single' activity in past, present and future states, as well as the possible contradictions between past, present and future concurrent activities.

Consider a situation where a future activity is being planned, an activity that has been run in various forms a number of times in the past. To graphically describe this situation, a minimum of two activities are required to depict the planning activity (P) and the meeting activity (the planned activity, M). In this relatively static depiction, the outcome from the planning activity (the plan) becomes a tool to be used in the meeting activity (see Figure 3).

This leads us to the development of the notation described here. The notation allows the researcher to breakdown the activity system into its relevant and useful components, while at the same time preserving the principles of historicity and expansive transformation. We continue the use of the planning activity to illustrate the process.

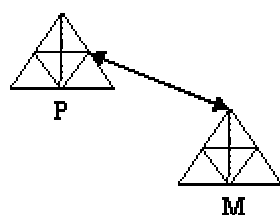


Figure 3: The planning activity and the meeting (planned) activity.

Planning increases the likelihood of the activity expanding. The consideration of various scenarios prior to the activity occurring (the externalised form) increases the chance of the activity being successful – and reducing the possible activity halting contradictions. Planning can also be viewed as reflection-before-action.

The contradiction that exists (possibly) between the two activities in Figure 3, according to Engeström's activity system in Figure 2, is the quaternary contradiction; existing between two concurrent activities. But when planning, one is considering how the meeting has been run before, and how the meeting activity has previously been planned. Incorporating these further activities results in an activity system represented by Figure 4. In Figure 4 the activities marked with a **P** are the planning activities, and those with an **M** are the meeting activities (which the facilitator is planning for). Planning activity **P'** is the culturally advanced form of planning activity **P**, and meeting activity **M'** is the culturally advanced form of meeting activity **M**.

In Figure 4, the contradictions that exist between the activities are shown by double headed arrows. The number attached to the arrow indicates the type of contradiction present (either tertiary or quaternary). In this way Figure 4 allows for the pictorial representation of the interacting activities in an activity system, and illustrates how when considering the planning of a meeting, the facilitator is also considering the impact that that planning will have on future meeting activities and on future planning activities. The system can be easily extended to a further expansive learning cycle by adding **P''**, and meeting activity **M''** (the double prime activities). To place the activity system in Figure 4 in context, in our example activities **P** and **M** are the past activities, **P'** and **M'** the current activities, and **P''** and **M''** the future activities.

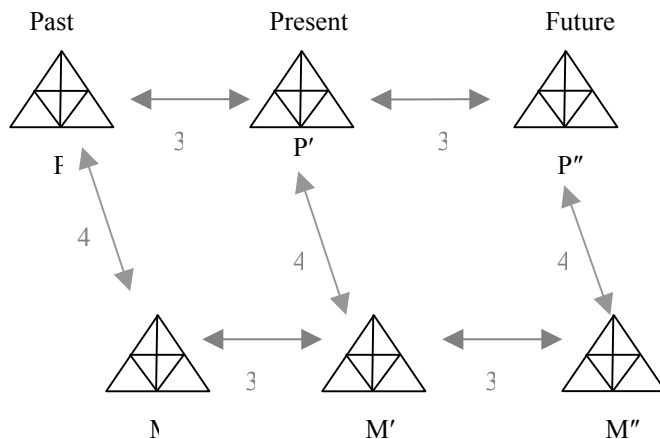


Figure 4: The planning activity (P') and the meeting activity (M') with their preceding activities (P and M respectively)

So far this discussion has introduced nothing new, but has illustrated how Engeström's theory of activity systems and the contradiction therein can be used to analyse how human activity develops. The example used does illustrate how the activity system can be seen to continue to expand (or contract), and in our work we have seen this useful in the study of activity undertaken by knowledge workers.

However, it was at this point that a problem is encountered. In our simple example there are interactions, or contradictions, that occur between activities that are not included on Figure 4. Contradictions may not occur between P and M' in all activity systems, but in our example it is reasonable to examine them. Similarly there are contradictions between P' and M to study.

Is this getting overly complex? The answer will depend on the purpose of the analysis and the activity system under investigation.

Figure 5 is constructed by adding the new contradictions to Figure 4.

What is the nature of these contradictions? The answer is beyond the scope of this paper, but we do provide a means to enable further discussion and research to proceed; the culturally advanced notation. In addition, the use of the notation allows the statement of these questions in a more precise manner that facilitates further research.

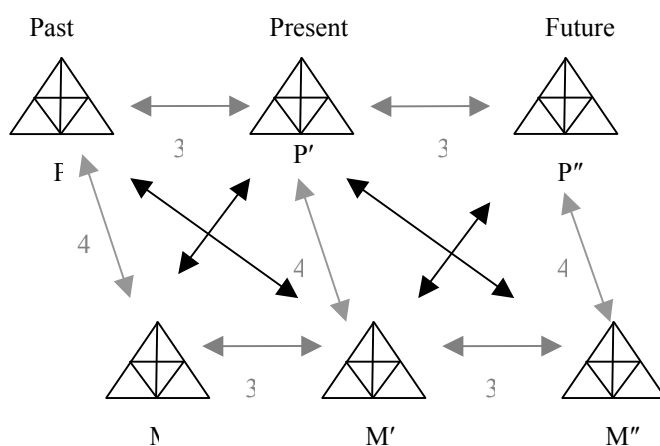


Figure 5: Contradictions between activities of different temporality

To fully analyse a planning activity system, it is necessary to simultaneously depict historical, current and future states of an activity, as well as the concurrent activities. Are there contradictions that exist between the current meeting (M') and a culturally advanced planning activity (P'')? The notation also clearly identifies which activity (or activities) is being described within a complex activity system.

Continuing the example, consider the planning of a future meeting. If there is a current way of undertaking a meeting and this has an impact on future means of planning, then we need to be able to depict this relationship with a contradiction. So, what type of contradiction are they? Is the contradiction between the current planning

activity (**P'**) and the culturally advanced meeting activity (**M''**) described in Table 1? In the total activity system, there is a need to identify these contradictions, and this rests on the assumption that issues between these two activities exists and can be identified.

Turner and Turner stated that “Activities are dynamic entities, having their roots in earlier activities and bearing the seeds of their own successors” (Turner and Turner, 2001, p.130). In the activity system described by Figure 5 there is not a single predecessor and it becomes clear that the nature of contradictions at level 4 are different, depending on the activity pairs being considered. The contradictions are the drivers towards culturally advanced activities, and if the nature of the contradiction can be identified then it provides a tool for further analysis. This is the “vision” that Bodker refers to, when she states “it is important to create specific visions about possible future work activities” (1991, p.561) We are searching for what Kutti (1996) describes as the misfit between different activities or the development stages of those activities.

4.1 What then is the nature of the new contradictions?

It is clear that the contradiction is not tertiary as defined by Engeström. One activity is not the culturally advanced form of the other. One is a culturally advanced activity but not of the other activity, and that key relationship is lost.

Could it be quaternary in nature? After all, it could be held that the planning activity (**P'**) is a concurrent activity of meeting activity **M**. However the fact that expansive learning has taken place makes the relation quite different. We leave this as an open question and propose the (interim) notation shown in Figure 6.

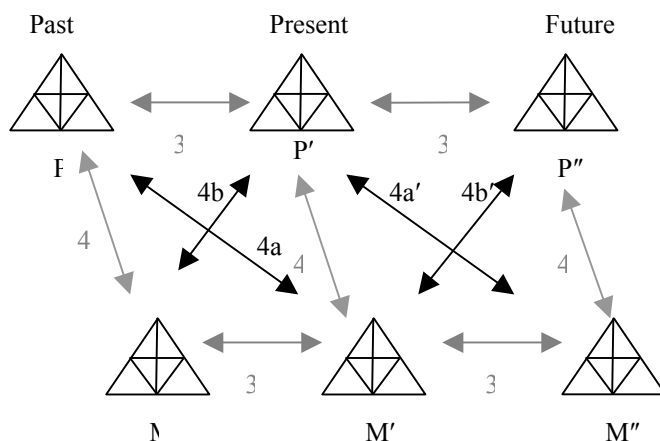


Figure 6: Labelling the Contradictions between activities of different temporality

5 CONCLUSION

The notation used in Figure 4 and Figure 5 can be summarized as follows.

- For an activity labelled **X**, the culturally advanced form of that activity is labelled **X'**. The culturally advanced form of **X'** is **X''**. This system can be extended in order to describe more complex activity systems.
- Contradictions have been identified between activities that are neither concurrent more culturally advanced (labelled **4a** and **4b** in Figure 6).

The notation described here has enabled the detailed discussion of a complex activity system by the introduction of a straightforward convention for labelling activities and the relations between them. Part of this advantage is the explicit recognition of the concept of historicity and its role in the expanding or contracting nature of activity systems as the contradictions are resolved. This approach can easily be extended depending on the level of complexity and the extent of the historical timeline pertinent to a given situation.

As a direct result of this simplification of the description of the activity system, we now find new questions can be posed. Using the notation described above, we ask the following questions.

- Q1. Do the contradictions labelled **4a** and **4b** share common characteristics?
- Q2. Do the contradictions labelled **4a** and **4a'** share common characteristics? Are they identical?
- Q3. Do the contradictions labelled **4b** and **4b'** share common characteristics? Are they identical?

This leads us to ask one final question.

- Q4. Is there a quinternary contradiction? In other words, is there a fundamental difference between **4**, **4a**, and **4b**?

The answers to these questions are outside the scope of this paper, but the notation introduced here makes it possible to ask them. Without the notation and associated concepts discussion of complex activity systems is extremely difficult. The questions raised above are in reality very complex, and it is the notation that makes it possible to express them in a precise and succinct manner. In a future paper we consider these and other questions in relation to the contradictions and their relationships further.

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